WebGL + THREE.js

codelab instructions

http:// animateyourhtml5.appspot.com

scroll to bottom, download zip and open:

```
part4 playground.htlm
part4 playground.js
```

1) setup 3D canvas

HTML:

```
<div id="cont" style="width: 800px, height: 600px" />
```

JS glue code:

```
document.addEventListener('DOMContentLoaded', function() {
    var cont = document.getElementById('cont');
    var renderer =
        new THREE.WebGLRenderer({antialias: true, alpha:true});
    renderer.setSize(cont.clientWidth, cont.clientHeight);

    // THREE.js creates the 3D <canvas> element for you
    cont.appendChild(renderer.domElement);

    // make it pretty (black and transparent)
    renderer.setClearColor(0x000000, 0);
    renderer.clear(true);
});
```

2) camera, action!

```
// CAMERA: field of view (angle), aspect ratio, near, far
var aspect = cont.clientWidth / cont.clientHeight
var camera = new THREE.PerspectiveCamera(35, aspect, 1, 3000);
camera.position.z = 300;

var scene = new THREE.Scene();

// STUFF:
// Cube parameters: w, h, d, wSegments, hSegments, dSegments
var geo = new THREE.BoxGeometry(100, 100, 100, 10, 10, 10);
var mat = new THREE.MeshBasicMaterial
                        ({color: 0xFF0000, wireframe: true});
var cube = new THREE.Mesh(geo, mat);
scene.add(cube);

// ACTION:
renderer.render(scene, camera);
```

3) spin it

```javascript
// ANIMATION LOOP
function animate(t) {

    cube.rotation.y = t/1000;
    cube.position.x = 50*Math.cos(t/1000);
    cube.position.z = 50*Math.sin(t/1000);

    renderer.render(scene, camera);

    // let the browser decide the tempo
    requestAnimationFrame(animate);
}
```

4) Try other geometries

```
// SPHERE: radius, wSegments, hSegments
new THREE.SphereGeometry(50, 20, 20)

// PLANE: width, height, wSegments, hSegments
new THREE.PlaneGeometry(100, 100, 20, 20)

// CYLINDER/CONE: rTop, rBottom, h, rSegs, hSegs
new THREE.CylinderGeometry(50, 50, 100, 20, 20)
```

5) skin it

```
THREE.MeshLambertMaterial({color: 0xffffff});
```

This will need some lights:

```
var light1 = new THREE.DirectionalLight(0xffffff, 0.6); // color, intens.
light1.position.set(-1, -1, 0.3); // SW directional light

var light2 = new THREE.PointLight(0xffffff, 0.6); // color, intens.
light2.position.set(200, 200, 300); // NE point light

var light3 = new THREE.DirectionalLight(0xffffff, 0.5); // color, intens.
light3.position.set(0, 0, 1); // frontal light

scene.add(light1);  scene.add(light2); scene.add(light3); // add them all
```

6) texture it

```
var texture =
THREE.ImageUtils.loadTexture(/*path*/);
THREE.MeshLambertMaterial({map: texture});
//WARNING: must run local server (instructions)
```

Textures:

textures/FernandoTogni.png

textures/FernandoTogniBW.png

7) Load a model

```javascript
var loader = new THREE.ColladaLoader();
loader.options.convertUpAxis= true;
loader.options.upAxis = 'Y';

var model;
loader.load("models/Android.dae",
                    function(collada) {
                        model = collada.scene;
                        model.position.set(0, -80, 0);
                        model.scale.set(3,3,3);
                        scene.add(model);
                    });
```
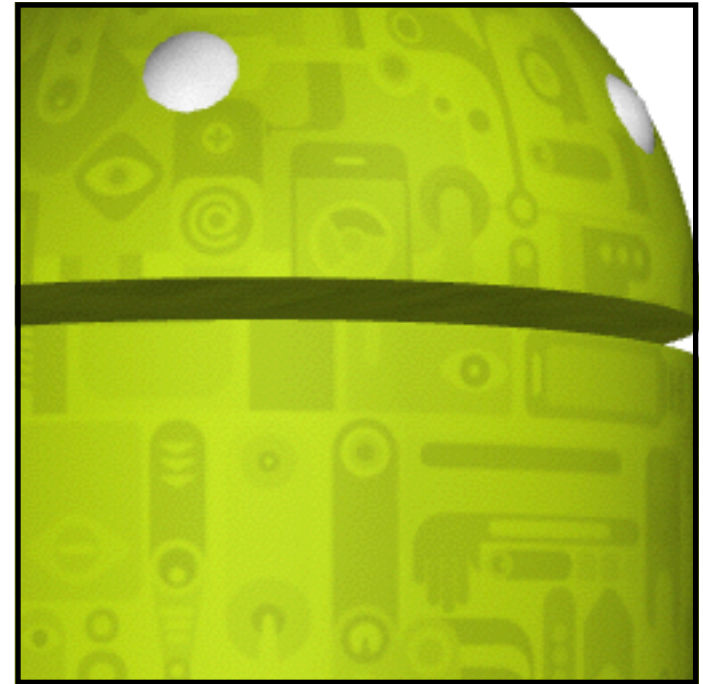
Other models:

Cupcake.dae	Froyo.dae	IceCreamSandwich.dae
Donut.dae	Gingerbread.dae	JellyBean.dae
Eclair.dae	Honeycomb.dae	KitKat.dae

8) skin the Android

textures/FernandoTogniBW.png
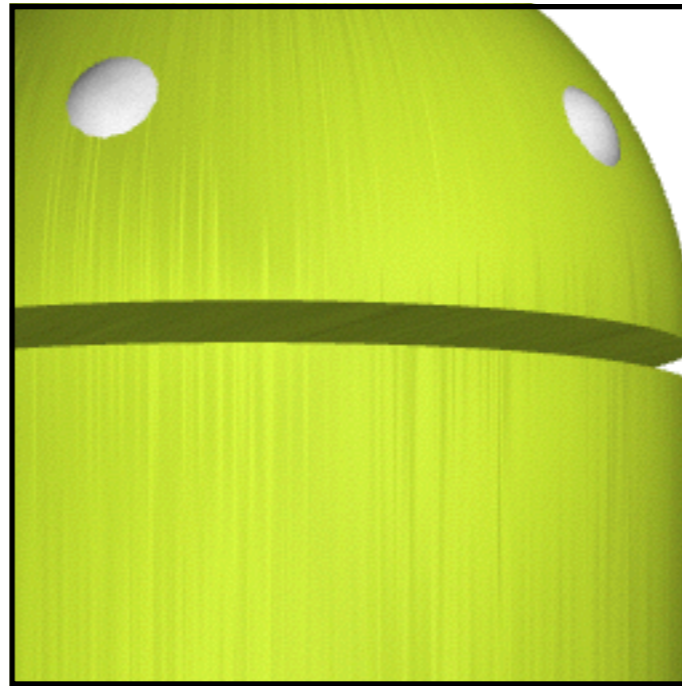with texture.repeat.x/y = 2

Texture with correct wrapping:

```
var texture = THREE.ImageUtils.loadTexture(/*path*/);
texture.wrapS    = texture.wrapT    = THREE.RepeatWrapping;
texture.repeat.x = texture.repeat.y = 2;
var material = new THREE.MeshPhongMaterial({color: 0xA4C639,
map: texture});
```

Replace all textures in the model:

```
model.traverse(function(child) {
    if (child instanceof THREE.Mesh
        && child.parent.name != 'eye') { // keep eyes white :)
        child.geometry.computeTangents(); // ask Mr. Doob
        child.material = material;
    } });
```
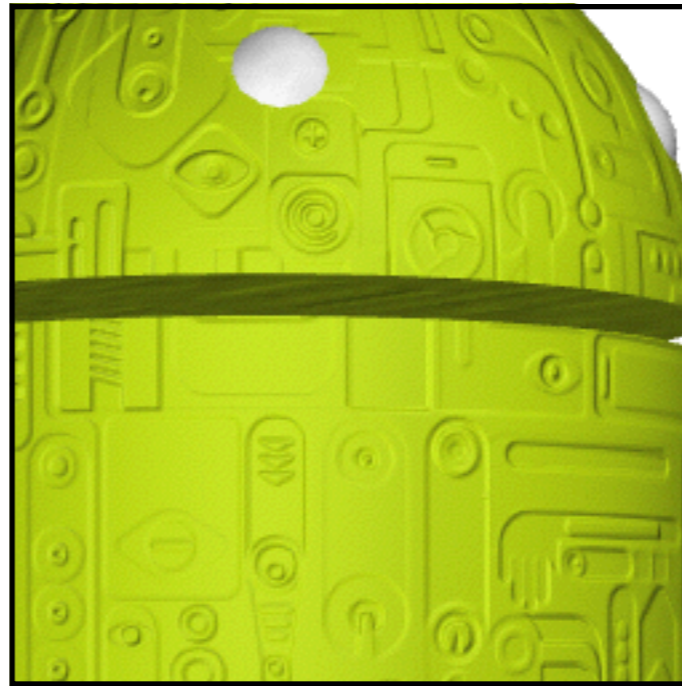
9) normal mapping

textures/brushedV.png
with texture.repeat.x = 2
also try brushedH.png

```
var material = new THREE.MeshPhongMaterial( {
    color: 0xA4C639+0x202020,
    normalMap: texture,
    normalScale: new THREE.Vector2(0.5, 0.5)
});
```
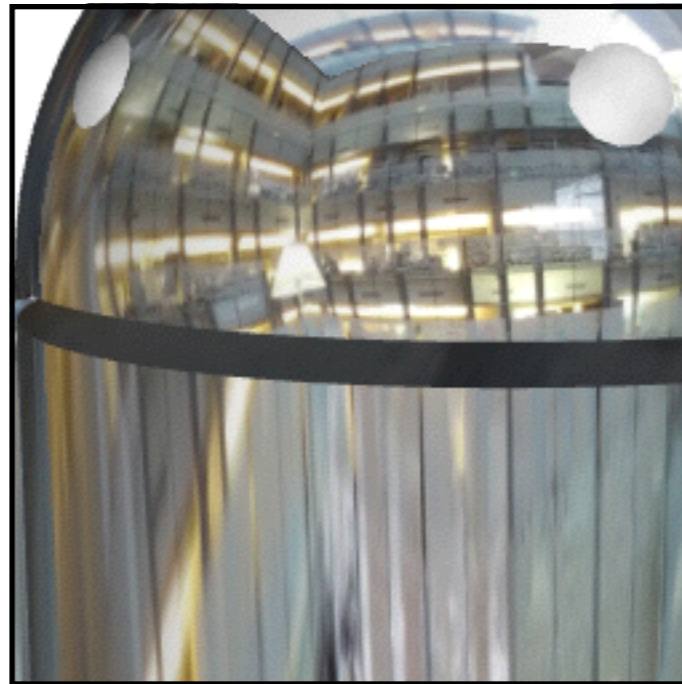
10) bump mapping

FernandoTogniBW.png
with texture.repeat.x/y = 3
also try padded.png with bumpScale=0.5

```
var material = new THREE.MeshPhongMaterial( {
    color: 0xA4C639+0x101010,
    bumpMap: texture,
    bumpScale: 3
});
```

10) environment mapping

textures/cnitcube3.jpg

textures/cnitcube1.jpg

textures/cnitcube5.jpg

textures/cnitcube6.jpg

textures/cnitcube2.jpg

textures/cnitcube4.jpg

```
var enviro = new
THREE.ImageUtils.loadTextureCube(
[/*left*/, /*right*/, /*top*/, /*bottom*/,
 /*front*/, /*back*/]);

var material = new
THREE.MeshPhongMaterial({envMap: enviro});
```

Go crazy!

html5rocks.com